

## Abstract

A controller 12 has an I/O crossover switching network 14, an optional I/O network expansion 16, a plurality of serial I/O shifters 18, a  
5 clock generator 20 and I/O control logic 22. The I/O crossover-switching network 14 is also referred to as an I/O multiplexer. Serial data may be transferred between a serial I/O shifter and an external device by way of a dedicated serial data pin (SDATA) 24 or an  
10 optional alternate pathway 26 which uses one of a plurality of parallel pins 28. The optional alternate pathway 26 can be used when pins 28 are unavailable or to reduce the number of pins on the device 12. The controller is shown to communicate with an external  
15 device 30 also having parallel pins 32. While a single device 30 is shown, the external device 30 can be any number of a plurality of devices having serial and parallel signal pathways that is controlled by the microprocessor 10 of the present invention.